

## Students' Career Interests and Understanding about Occupations: A Study Using Whyville Players' Behavioral Data

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According to data based on the 2013 ACT®-tested graduating class,<sup>1</sup> 62% of students indicated that they needed assistance with their educational and occupational plans. Moreover, only 36% planned to enroll in a college major that fit well with their interests, as measured by the ACT Interest Inventory. A good understanding of different occupations and early career preparation is essential to making informed occupational choices.<sup>2</sup> Engaging resources that help students explore careers and obtain occupational information may encourage more students to gain that understanding.

In 2013, ACT partnered with Numedea<sup>3</sup> and launched the ACT Career Club in Whyville,<sup>4</sup> a leading educational, virtual world for children ages 8–15. The ACT Career Club provides innovative ways for young students to engage in career exploration and gain occupational knowledge. It encourages students to take a proactive role in exploring career/occupation information through directed gaming. One of the central functional units in the ACT Career Club is the main CareerQuest room. In this room, students can freely browse information about occupations organized under 26 Career Areas, which are

further nested within six Career Clusters. Students also have the option to play a CareerQuest game where they navigate the Career Clusters (represented by rooms off the main room) and find which Career Area (represented by objects in the Career Cluster rooms) each occupation falls under. The other main room is the Job Center, which includes brochures and information about occupations and how to consider, select, and prepare for them, both in Whyville and in real life.

Over about a 21-month period (March 2013 to December 2014), 139,778 users visited the ACT Career Club, and 124,516 users (89%) visited the ACT Career Club at least twice. In March 2013, the number of visitors per month was around 2,000; this number increased significantly over 21 months to around 8,000 visitors per month by the end of 2014. The number of adolescent users' (ages 13–16) grew the most during the 21-month period. Also, the number of female users grew faster than male users. In this sample, 101,476 of the users were female, which was about 2.5 times the number of male users. This may be because, in general, 70% of Whyville users are female. Additionally, three percent of Whyville visitors are age 7–8; 13% are age 9–10; 26% are

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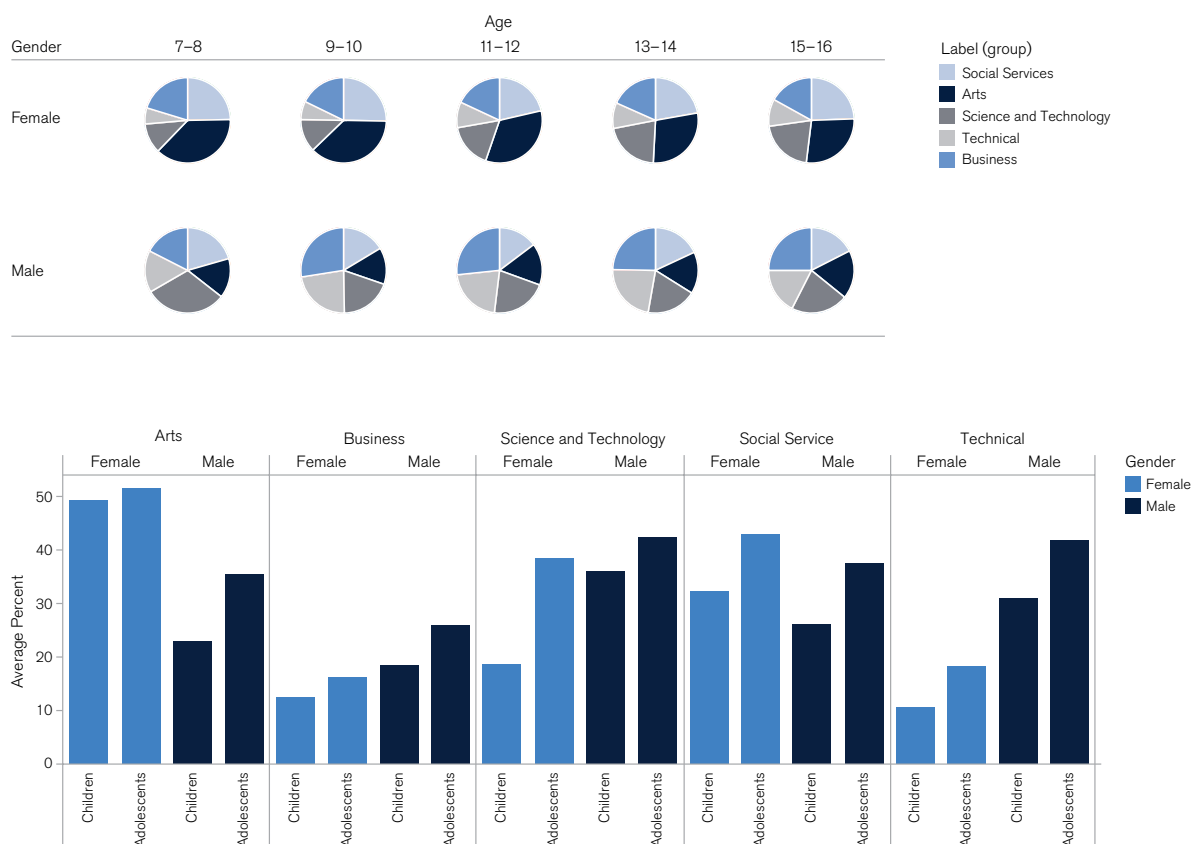


Figure 1. Career Cluster interest by gender and age

age 11–12; 35% are age 13–14; and 23% are age 15–16. This Issue Brief summarizes data collected from the ACT Career Club with an emphasis on student behavior within the CareerQuest room. The purpose is to use visitor behavior to better understand the development of adolescents' career interests and understanding about occupations.

## Part 1. Which occupation clusters were users interested in?

Users who entered the CareerQuest game room could play a timed quest game which guided them through the six Career Clusters (Social Service, Arts, Science and Technology, Technical, and Business<sup>6</sup>) and nested career areas. Alternatively, users could browse clusters and areas freely. The content users chose to browse outside of the quest game was assumed to reflect their personal

career interests. For each gender and age subgroup, the percentage of users who browsed each Career Cluster without playing the quest was calculated. For example, 43% of 7–8-year-old female users who entered the CareerQuest game room browsed the "Art" cluster, as compared to 21% of 7–8-year-old male users. A larger percentage suggests that users of that specific age and gender group have a higher career interest in that cluster of occupations than users in other subgroups. To better illuminate the differences in interests between developmental stages, students ages 7–12 were grouped as children and students ages 13–16 were grouped as adolescents (these definitions also apply to the other analyses in this Issue Brief). This analysis can help us understand the development of children's career interests and gender differences in their development.

## Key Findings (Figure 1)

The pie chart shows differences in interests across age groups and gender. Art was the dominant occupation cluster for female users across age groups. At age 15–16, female users' career interests were mainly focused on Arts, Social Service, and Science and Technology. Older female users showed more interest in Science and Technology than did younger female users. Science and Technology and Technical occupations were the dominant occupation clusters for male users across age groups. Male students' career interests were nearly equal across the five clusters at ages 15–16. Overall, the Career Cluster in which both genders showed the least interest was Business.

The bar chart shows differences in interests between male and female users across developmental stages. Overall, adolescent

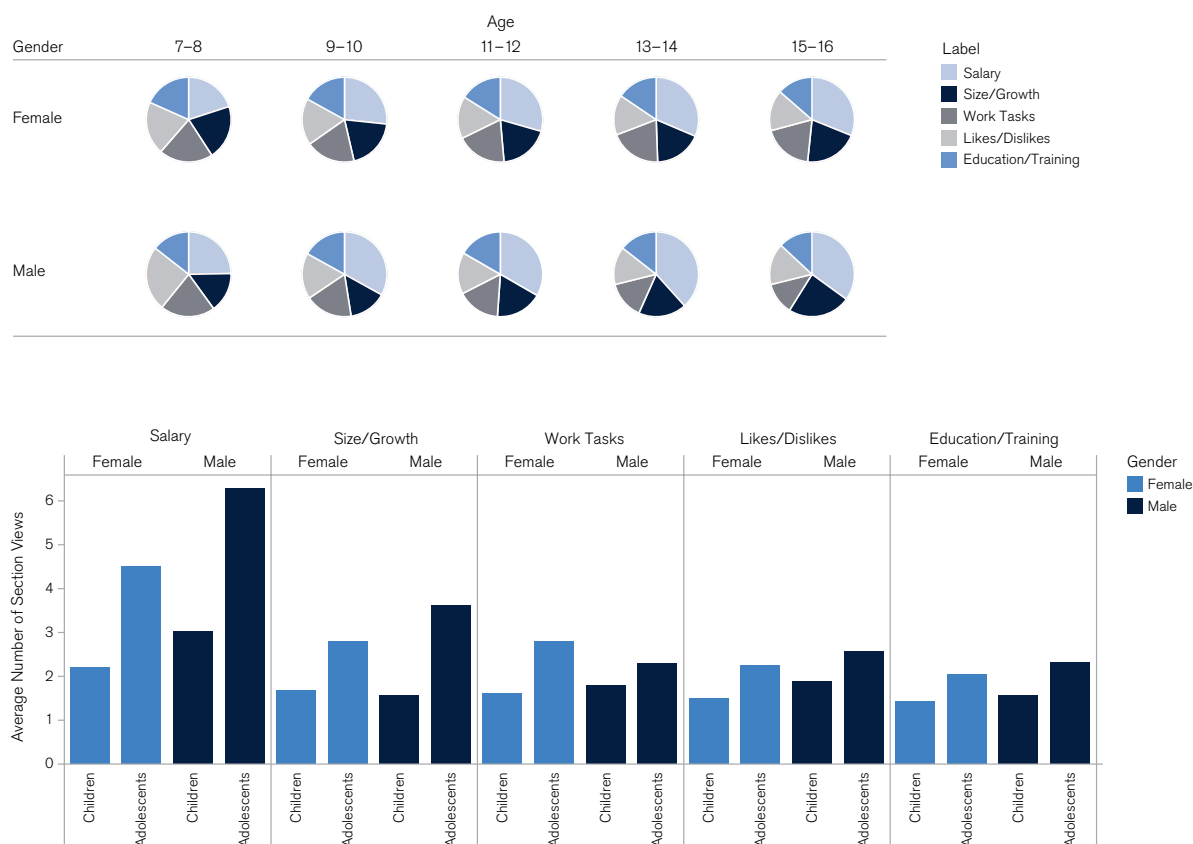


Figure 2. Information seeking by gender and age

users browsed more occupation clusters than did younger users, with male users exploring more career clusters than female users on most clusters. The percentage of adolescent female users who browsed Science and Technology (39%) was only slightly lower than the percentage of adolescent male users who browsed Science and Technology (43%). However, there was still only a small fraction of female users who showed interest in Business and Technical occupations across age groups (11%–18%).

## Part 2. What did users want to know about an occupation?

When users reached an occupation page, either by freely browsing or by playing the quest games, they could choose to view information about that occupation. There were five types of information: salary, work tasks, likes/dislikes, size/growth,<sup>6</sup> or

education/training of the occupation. Users could select multiple types of occupational information on multiple occupation pages. We calculated the average counts of information types viewed by each user each time they visited the CareerQuest game room. A large number suggests that users were interested in that type of occupational information. This analysis can help us understand how users' interest in different types of occupational information differs between age groups and genders.

### Key Findings (Figure 2)

The pie chart shows differences in interest of occupational information across age groups and gender.

Starting at 9–10 years old, users of both genders were more interested in salary information than other types of information,

and interest in salary information was even higher in older age groups. For age 15–16, each female user had five views of salary information, on average, and each male user had six views of salary information, on average. Users only viewed about two to three pieces of other types of occupational information. For both gender groups, older users valued salary information more than younger users did.

The bar chart shows more of the differences in interest between genders and developmental stages.

Adolescents had one to three more views of information of all types than did children. The largest difference was in salary information, followed by information about size/growth. These differences were more pronounced in male users than in female users. The

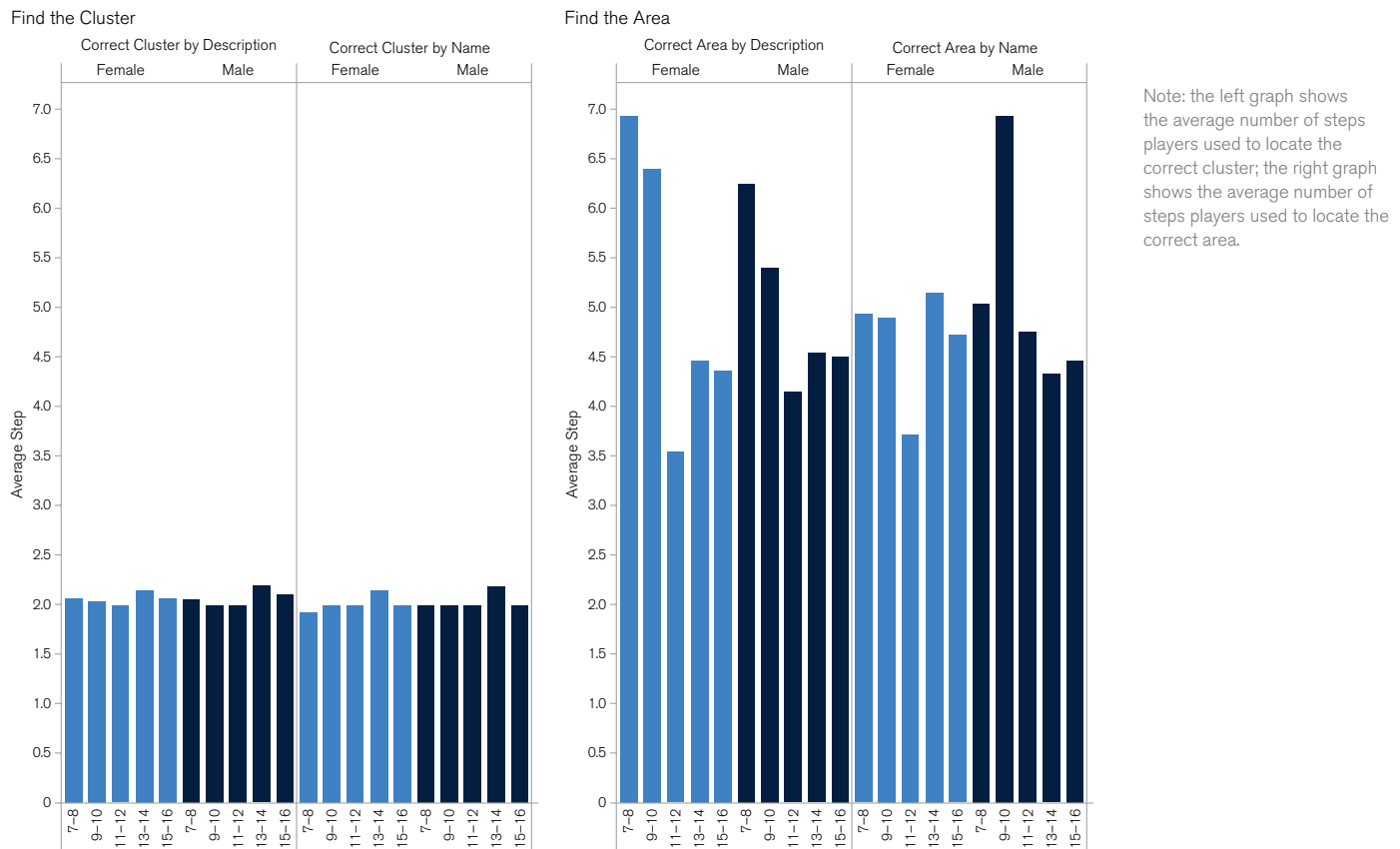


Figure 3. Average number of steps used to locate correct Career Cluster and area

difference in interest between children and adolescents in information of likes/dislikes, work tasks, and education/training were smaller and comparable to one another. The difference in interest in work task information was more pronounced in female users than in male users.

### Part 3. How much did users understand occupations?

Users who participated in the quest games were asked to locate an occupation according to either its description or its name (e.g., sales engineer). To locate the correct occupation, players needed to choose the right cluster (e.g., Administration and Sales) from the six potential career clusters. Then they needed to choose the right career area (e.g., Marketing and Sales) within the right cluster. The number of steps players used to find the correct cluster or area was

recorded. A large number indicates difficulty completing the tasks.

#### Key Findings (Figure 3)

On average, players required two steps to locate the correct cluster of an occupation, and there was little gender or age difference in locating the correct cluster.

Younger players (age 7–10) required more steps to locate the correct area of an occupation than did older players when using job description as a clue rather than job title. Name clues seemed to be more helpful for young female users to locate the right area of an occupation than description clues.

#### Summary and Educational Implications

We used Whyville users' behavioral data to investigate students' career interest

development and gender differences in their development. Here we discuss some interesting findings that may shed light on educational interventions.

1. **At younger ages, female users showed more interest in Art occupations than did male users, and male users showed more interest in Science and Technology occupations than did female users.** These differences varied among older students. In addition, male users voluntarily explored more and wider occupational options than female users. In contrast to common gender stereotypes, the current research using voluntary behavior data showed that without monitoring, middle school female users demonstrated a high interest in exploring Science and Technology

occupations. Mendez & Crawford (2002)<sup>7</sup> found that female students were interested in a greater number of careers than male students, but the opposite was found with this behavioral data. Traditional self-reporting on occupational interests may be influenced by social appraisal, peer pressure, and stereotypes. This suggests that behavioral measures in games may provide valuable information to understand children's true interests. It is also possible that female students who use Whyville are more interested in innovative science and technology or that they are from families that place a higher value on science and technology. Engaging in the use of technology may help females gain an interest in traditionally male occupations. Also, it is important to encourage and support female students' career exploration activities.

2. **The most popular occupational information for both genders was salary. Across age groups, older male users' interest in size/growth information increased, while interest**

**in information about work tasks decreased as they got older.** Also, even for students ages 15–16, male and female users all paid only a small amount of attention to information about the education/training required for occupations. Both male and female users showed insufficient interest on education/training information, which is crucial to inform them of what they need to do to become qualified for a given occupation. It may be helpful for parents and educators to encourage students to pay more attention to other important occupational information, like education/training, when their students have set a career goal.

Male and female users' interest in salary information may be helpful for them to set a career goal, but a focus on salary alone may result in low job satisfaction if the work does not fit with one's interest, skills, and abilities. Parents and educators should emphasize the importance of the fit between the job tasks and one's abilities and interests in career education.

3. **Older users were able to accurately classify an occupation in fewer attempts than younger users.** Younger female users were more successful at identifying career areas by job titles than by job descriptions.

These results suggest that career education for younger students should help them understand the relationships between job titles and the tasks performed within those occupations. Often, the name of an occupation can provide some important information about the work that it entails, but it can also be misleading at times. Adults should guide students to fully understand the responsibilities and job requirement of an occupation.

Overall, the findings of this study suggest that students become interested in exploring career options and gain some career knowledge at a relatively early age, but may need guidance about the type of information they should seek to help them make informed decisions when planning for their future. ■

## Appendix

Table 1. Average Ratio of Subgroup Users Who Voluntarily Checked an Occupational Cluster

		Social Service	Arts	Science and Technology	Technical	Business
Boys	15–16	36.08	37.01	44.59	35.30	25.46
	13–14	39.43	34.64	40.59	48.94	26.71
	11–12	24.29	26.16	35.03	35.07	21.73
	9–10	26.17	22.17	30.70	36.30	21.61
	7–8	28.69	20.85	43.09	22.12	11.98
Girls	15–16	43.38	48.27	36.91	18.09	14.88
	13–14	43.00	55.46	40.48	18.60	17.61
	11–12	32.70	51.85	25.65	14.96	13.58
	9–10	36.60	53.76	17.78	10.31	12.58
	7–8	28.19	42.97	12.69	7.03	11.51

Table 2. Average Number of Pieces of Occupational Information Viewed by a Single User

		Salary	Size/Growth	Work Tasks	Likes/Dislikes	Education/ Training
Boys	15–16	6.01	4.07	2.10	2.68	2.21
	13–14	6.55	3.13	2.46	2.46	2.44
	11–12	3.44	1.85	1.66	1.64	1.71
	9–10	3.31	1.43	1.78	1.76	1.66
	7–8	2.32	1.41	1.95	2.29	1.33
Girls	15–16	4.76	3.14	2.94	2.39	2.04
	13–14	4.23	2.41	2.65	2.07	2.06
	11–12	2.95	1.88	1.90	1.62	1.58
	9–10	2.21	1.64	1.57	1.47	1.39
	7–8	1.40	1.44	1.42	1.40	1.26

Table 3. Average Steps Used to Locate the Right Cluster/Area

		Cluster		Area	
		Description Clue	Name Clue	Description Clue	Name Clue
Boys	15–16	2.11	2.00	4.50	4.46
	13–14	2.21	2.21	4.54	4.32
	11–12	2.00	2.00	4.14	4.75
	9–10	2.00	2.00	5.39	6.93
	7–8	2.07	2.00	6.25	5.04
Girls	15–16	2.04	2.00	4.36	4.71
	13–14	2.14	2.14	4.46	5.14
	11–12	2.00	2.00	3.54	3.71
	9–10	2.04	2.00	6.39	4.89
	7–8	2.07	1.93	6.93	4.93

## Notes

- 1 [www.act.org/collegechoice/13/](http://www.act.org/collegechoice/13/).
- 2 Bobek, B. & Zhao, R. (2015). "Education and Career Navigation." In R. O'Connor, W. Camara, K. Mattern, & Hanson. M. A. (Eds.), *Beyond Academics: A holistic framework for enhancing education and workplace success*. Iowa City: ACT.
- 3 Numedeeon Inc. is a privately held, Pasadena, California-based company that specializes in developing immersive online digital learning technology. In 1999, Numedeeon launched Whyville.net, the Internet's first social environment for children.
- 4 [ACT.whyville.net](http://ACT.whyville.net).
- 5 Only five of the six clusters are reported here. The "Administration and Sales" and "Business Operations" clusters are combined into one Business cluster due to the small sample size.
- 6 This refers to information about the size and growth of the job market.
- 7 Mendez, L. M., & Crawford, K. M. (2002). Gender-role stereotyping and career aspirations: A comparison of gifted early adolescent boys and girls. *Journal of Secondary Gifted Education*, 13(3), 96–107.
- 8 Kristof, A. L. 1996. Person-organization fit: An integrative review of its conceptualizations, measurement, and implications. *Personnel Psychology*, 49, 1–49.